

Storm runoff simulation based on the spatially distributed runoff curve number and time variant routing methods

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Abstract In this study, a GIS-based, simple and easily performed modelling approach was proposed to simulate storm runoff response processes with consideration of spatial and temporal variability of runoff generation and flow routing through the hillslope and river network. The watershed was discretized into grid cells, and the river network was delineated from the DEM by use of GIS. In the modelling approach, the US Department of Agriculture Soil Conservation Service (SCS) curve number (CN) method in its differential form was used to calculate surface runoff (or excess rainfall) for each grid cell. The surface runoff was then routed to the watershed outlet using an improved spatially distributed travel time method. The approach was applied to simulate eight storm runoff events in the Jiaokou Reservoir watershed, a sub-basin of the Yongjiang River basin in southeast China. The results showed that the proposed approach predicted the runoff processes with an average efficiency of 0.94.

Key words storm runoff; spatially distributed routing; curve number; geographic information systems
